# Flame - retardant ABS

## | Product Introduction |

Kumho's flame-retardant ABS resin is approved by UL and CSA. The flame-retardant ABS resin, which has outstanding, impact strength, weather resistance and chemical resistance, is suitable for home electronics and office automation equipment that require flame- retardant quality, such as computer monitors and TV housings.

## | Characteristics & Applications |

| Grade | | Characteristics | Applications |
|---|---|---|---|
| General Purpose | HFA 703 | High Rigidity | Computer monitors, Copy machine, etc. |
| | HFA 707 | General Purpose | |
| | HFA 451 | High Flammability | |
| | HFA 452 | Low Flammability | |
| | HFA 462 | Extrusion | Profile, Sheet requiring flammability |
| Weather Resistane | HFA 705 | General Purpose | Computer monitors, Copy machine, etc. |
| Special Purpose | HFA 700HT | Super Heat Resistance | Temperature controller, Electric concent |
| | HFA 456 | Non-Halogen | Non-toxic V-2 application as Home eletronics Housing |

## | Flame - retardant ABS |

Flame – retardant ABS

| Test Item / Unit | Test Method (ASTM) | Test Condition | General Purpose | | | | | Weather Resistance | Special Purpose | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | HFA-703 High Rigidity | HFA-707 General Purpose | HFA-451 High Flammability | HFA-452 Low Flammability | HFA-462 Extrusion | HFA-705 Weather Resistance | HFA-700HT Super Heat Resistance | HFA-456 Non-halogen |
| Tensile Strength [kg/cm²(psi)] | D638 | 23℃ | 510 (7,250) | 420 (5,970) | 420 (5,970) | 460 (6,540) | 520 (7,367) | 460 (6,540) | 440 (6,260) | 520 (7,367) |
| Elongation [%] | D638 | 23℃ | 30 | 20 | 20 | 20 | 25 | 20 | 15 | 20 |
| Flexural Strength [kg/cm²(psi)] | D790 | 23℃ | 670 (9,530) | 600 (8,530) | 600 (8,530) | 700 (9,960) | 630 (8,960) | 650 (9,250) | 700 (9,950) | 700 (9,950) |
| Flexural Modulus [kg/cm²(psi)] | D790 | 23℃ | 24,000 (341,400) | 23,000 (327,000) | 23,000 (327,000) | 26,000 (370,000) | 25,000 (355,000) | 24,000 (341,400) | 27,000 (384,000) | 27,000 (384,000) |
| IZOD Impact strength [Kg·cm/cm (ft·lb/in)] | D256 | 3.2mm, Notched, 23℃(73℉) | 16 (2.9) | 22 (4.1) | 21 (4.0) | 15 (2.8) | 22 (4.1) | 15 (2.8) | 15 (2.8) | 15 (2.8) |
| | | 6.4mm, Notched, 23℃(73℉) | 14 (2.6) | 19 (3.5) | 18 (3.3) | 14 (2.6) | 20 (3.7) | 14 (2.6) | 14 (2.6) | 14 (2.6) |
| Rockwell Hardness | D785 | R scale | 105 | 100 | 100 | 102 | 105 | 102 | 100 | 100 |
| Heat Distortion Temp.[℃(℉)] | D648 | 18.6kg/cm²(264psi) Unannealed | 76(169) | 76(169) | 76(169) | 80(176) | 80(176) | 78(172) | 87(189) | 76(169) |
| Vicat Softening Temp.[℃(℉)] | D1525 | | 91(196) | 91(196) | 91(196) | 96(205) | 96(205) | 96(205) | 101(214) | 91(196) |
| Melt Flow Index [g/10min] | D1238 | 200℃, 5kg | 3 | 6 | 6 | 5.5 | 1.6 | 5 | 2 | 5 |
| | | 220℃, 10kg | 30 | 60 | 60 | 55 | 16 | 50 | 1.5 | 50 |
| | | 200℃, 21.6kg | 60 | 120 | 120 | 110 | 32 | 90 | 18 | 100 |
| Molding Shrinkage [%] | D955 | | 0.4~0.7 | 0.4~0.7 | 0.4~0.7 | 0.4~0.7 | 0.4~0.7 | 0.4~0.7 | 0.4~0.7 | 0.4~0.7 |
| Specific Gravity | D792 | | 1.18 | 1.18 | 1.18 | 1.07 | 1.18 | 1.18 | 1.18 | 1.06 |
| Water Absorption [%] | D570 | | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Flammability | UL94* | 1.5mm | V-0 | | V-0 | V-2 | V-0 | | V-0 | V-2 |
| | | 2.1mm | | V-0 | V-0, 5VB | | | V-0 | | |
| | | 3.0mm | V-0 | V-0, 5VB | V-0, 5VB | | V-0 | V-0 | V-0 | V-2 |

(*)UL File No. E65424 (CSA File No. LS66457)

Note 1) These are typical property values, not specifications.
Note 2) In case of colored products, the values could vary slightly by color.
Note 3) Values are measured at 23℃ and in RH of 50% on injection molded specimens.

Revision 5

2012. 10

SAMYANG® CHEMICAL

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beyond the best

# KUMHO ABS

Acrylonitrile Butadiene Styrene

KUMHO PETROCHEMICAL

# ABS

## | Product Introduction |

Whether you require general purpose, plating, low-gloss, flame-retardant, or a heat-resistant grade, Kumho produces the ABS resin for your specific application.
Kumho ABS resins are widely used for injection molding, extrusion molding, vacuum forming, thermoforming and blow molding with dimensional stability and high gloss surface.
Furthermore, they will grant excellent secondary processing characteristics, such as adhesion, plating, paint and sputtering.

## | Characteristics & Applications |

| Grade | | Characteristics | Applications |
|---|---|---|---|
| plating | ABS 710 | General plating | Automobile parts, Cosmetics cases, Refrigerator knobs, Various knobs |
| | ABS 710G | Plating, Adhesion strength reinforced | |
| High rigidity | ABS 720 | High rigidity | Cassettes, Radios, Video tape cases |
| | ABS 720R | High rigidity | Automobile batteries |
| | ABS 722P | High rigidity, extrusion molding use | Trays for semi-conductor |
| | ABS 722W | Scratch resistance | Cassettes, Radios, Video tape cases |
| High gloss | ABS 728 | General high gloss | Products demanding for gloss : Sweeper, Washing machine cover etc |
| | ABS 728W | High gloss, weather stable | |
| High impact strength | ABS 740 | High impact resistance | Automobile parts(radiator grill etc), Helmets, Toys |
| | ABS 745 | Super impact resistance | Helmets, Suitcase |
| | ABS 749 | Compounding use | Compounding use |
| Easy flow, medium impact strength | ABS 750 | General easy flow | Household appliances, Office equipments, Miscellaneous goods |
| | ABS 750SH | Easy flow, white | |
| | ABS 750SW | Super white | |
| High flow | ABS 780 | High flow | Household appliances, Office equipments, Miscellaneous goods |
| | ABS 780M | High flow, Painting use | Computer monitors |
| | ABS 780F | Super flow | Large size injection molded products, TV housings, |
| Painting | ABS 765 | General painting use | Injection molded products for painting : Automobile parts, Household appliances |
| Refrigerator sheet | ABS 775 | High impact resistance | Refrigerator inner case, door liner(cyclopentane foaming agent use) |
| | ABS 775T | Thin layer use | |
| | ABS 775EG | General extrusion molding use | Edge bands |

| Grade | | Characteristics | Applications |
|---|---|---|---|
| Extrusion molding | ABS 795 | High impact strength, easy flow | Pipe, Briefcases |
| ESCR | ER872M | Extrusion molding use | Refrigerator inner case, door liner(HCFC-141b foaming agent use) |
| | ER875 | Injection molding use | Injection molded products :Refrigerator door cap etc(HCFC-141b foaming agent use) |
| Blow molding | BM510 | Heat resistance, general use | Automobile rear spoiler |
| | BM530 | High heat resistance | |
| Low gloss | ABS 770ZH | General extrusion molding use | Extruded products demanding for low gloss |
| | H2938Z | Heat resistance | Injected products demanding for heat resistance and low gloss" |
| | HU650ZW | High heat resistance, weather stable | |
| Heat resistance | ABS 730 | Semi heat resistance | Rear garnish, Automobile parts, Light electronical appliances |
| | H2938 | Heat resistance | Automobile parts, Mirror housing, Radiator grills, Rear lamp housings |
| | H2938L | Heat resistance, painting use | |
| | HU600 | High heat resistance | |
| | HU600SKG | High heat resistance, low shrinkage | |
| | HU621 | Heat resistance, high impact strength | |
| | HU650 | Super heat resistance | |
| | HGX 4500 | Ultra high heat resistance | |
| Aluminum Sputtering | H2938DS | Heat resistance, AL sputtering | Automobile parts : Rear lamp housings |
| | HU600DS | High heat resistance, AL sputtering | |
| Odorless heat resistance | HU601 | Heat resistance, odorless | Automobile parts demanding for heat resistance and odorless |
| | HU651 | High heat resistance, odorless | |

## | Typical Properties |

Typical Properties

| Test Item / Unit | Method (ASTM) | Test condition | Electro-plating | | High rigidity | | | | High gloss | | High impact strength | | | | | | Painting | High flow | | | Sheet extrusion for refrigerator | | | Extrusion molding | ESCR | | Blow molding | | Low gloss | | | Heat resistance | | | | | | | | | Aluminum sputtering | | Odorless heat resistance | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ABS 710 General plating | ABS 710G Plating, adhesion reinforced | ABS 720 High rigidity | ABS 720R High rigidity | ABS 722P High resigidity, extrusion molding use | ABS 722W Scratch resistance | ABS 728 High gloss | ABS 728W High gloss, weather stable | ABS 740 High impact | ABS 745 Super high impact | ABS 749 Compounding use | ABS 750 General purpose | ABS 750SH Easy flow, white | ABS 750SW Super white | ABS 765 Painting use | ABS 780 High flow | ABS 780M High flow, painting | ABS 780F Super flow | ABS 775 High impact | ABS 775T Thin layer use | ABS 775EG Edge band | ABS 795 High impact, easy flow | ER872M Extrusion molding | ER875 Injection molding | BM510 General | BM530 High heat | ABS 770ZH Extrusion molding | H2938Z Heat resistance | HU650ZW Heat resistant, weather stable | ABS 730 Semi heat resistance | H2938 Heat resistance | H2938L Heat resistance, painting use | HU600 High heat resistance | HU600SKG High heat, low shrinkage | HU621 Heat resistance, high impact strength | HU650 Super heat resistance | HGX4500 Ultra high heat resistance | H2938DS Heat resist | HU600DS High heat resistance | HU 601 Heat resistance | HU 651 High heat resistance |
| Tensile Strength [kg/cm²(psi)] | D638 | 23℃, 50mm | 410<br>5,740 | 440<br>6,160 | 500<br>7,000 | 530<br>7,420 | 550<br>7,700 | 650<br>9,100 | 470<br>6,580 | 470<br>6,580 | 420<br>5,880 | 420<br>5,880 | 320<br>4,480 | 465<br>6,510 | 470<br>6,580 | 485<br>6,790 | 460<br>6,440 | 465<br>6,510 | 460<br>6,440 | 440<br>6,160 | 450<br>6,300 | 480<br>6,720 | 430<br>6,020 | 400<br>5,600 | 430<br>6,020 | 450<br>6,300 | 430<br>6,020 | 430<br>6,020 | 450<br>6,300 | 450<br>6,300 | 480<br>6,720 | 470<br>6,580 | 475<br>6,650 | 500<br>7,000 | 475<br>6,650 | 500<br>7,000 | 480<br>6,720 | 485<br>6,790 | 430<br>6,020 | 480<br>6,720 | 500<br>7,000 | 500<br>7,000 | 485<br>6,790 |
| Elongation [%] | D638 | 23℃ 50mm | 25 | 20 | 20 | 15 | 10 | 10 | 20 | 20 | 25 | 25 | 30 | 20 | 15 | 15 | 20 | 20 | 20 | 20 | 25 | 20 | 25 | 25 | 25 | 20 | 25 | 25 | 25 | 20 | 15 | 20 | 20 | 15 | 20 | 15 | 20 | 15 | 20 | 20 | 15 | 20 | 20 |
| Flexural Strength [kg/cm²(psi)] | D790 | 23℃, 3mm | 600<br>8,400 | 640<br>8,960 | 720<br>10,080 | 750<br>10,500 | 800<br>11,200 | 890<br>12,460 | 650<br>9,100 | 650<br>9,100 | 580<br>8,120 | 580<br>8,120 | 500<br>7,000 | 620<br>8,680 | 660<br>9,240 | 700<br>9,800 | 640<br>8,960 | 620<br>8,680 | 620<br>8,680 | 580<br>8,120 | 630<br>8,820 | 670<br>9,380 | 630<br>8,820 | 520<br>7,280 | 580<br>8,120 | 600<br>8,400 | 620<br>8,680 | 630<br>8,820 | 550<br>7,700 | 700<br>9,800 | 650<br>9,100 | 620<br>8,680 | 640<br>8,960 | 670<br>9,380 | 640<br>8,680 | 670<br>9,380 | 620<br>8,680 | 670<br>9,380 | 620<br>8,680 | 650<br>9,100 | 670<br>9,380 | 650<br>9,100 | 640<br>8,960 |
| Flexural Modulus [kg/cm²(psi)] | D790 | 23℃, 3mm | 20,000<br>284,000 | 21,000<br>298,200 | 25,000<br>355,000 | 25,500<br>362,100 | 28,500<br>404,700 | 30,000<br>426,000 | 22,000<br>312,400 | 22,000<br>312,400 | 20,000<br>284,000 | 17,500<br>248,500 | 17,000<br>241,400 | 21,000<br>298,200 | 22,500<br>319,500 | 23,500<br>333,700 | 21,000<br>298,200 | 21,500<br>305,300 | 22,000<br>312,400 | 20,000<br>284,000 | 22,000<br>312,400 | 24,000<br>340,800 | 22,500<br>319,500 | 16,500<br>234,300 | 19,500<br>276,900 | 20,500<br>291,100 | 22,000<br>312,400 | 20,000<br>284,000 | 17,000<br>241,400 | 20,000<br>284,000 | 22,500<br>319,500 | 21,000<br>298,200 | 21,500<br>305,300 | 23,000<br>326,600 | 21,500<br>305,300 | 23,000<br>326,600 | 18,500<br>262,700 | 22,000<br>312,400 | 22,000<br>312,400 | 22,500<br>319,500 | 22,000<br>312,400 | 21,000<br>298,200 | 20,500<br>291,100 |
| Rockwell Hardness | D785 | R scale | 102 | 102 | 112 | 113 | 118 | 120 | 108 | 108 | 98 | 98 | 94 | 108 | 108 | 109 | 106 | 108 | 108 | 105 | 105 | 107 | 105 | 93 | 98 | 100 | 100 | 102 | 109 | 107 | 105 | 108 | 110 | 111 | 110 | 112 | 101 | 109 | 108 | 110 | 110 | 106 | 105 |
| IZOD Impact strength [Kg·cm/cm (ft·lb/in)] | D256 | 3.2mm, Notched, 23℃ | 36<br>6.6 | 35<br>6.4 | 25<br>4.6 | 20<br>3.7 | 10<br>1.8 | 12<br>2.2 | 27<br>5.0 | 27<br>5.0 | 36<br>6.6 | 45<br>8.3 | 40<br>7.3 | 30<br>5.5 | 28<br>5.1 | 24<br>4.4 | 36<br>6.6 | 27<br>5.0 | 32<br>5.9 | 22<br>4.0 | 45<br>8.3 | 38<br>7.0 | 38<br>7.0 | 48<br>8.8 | 60<br>11.0 | 30<br>5.5 | 35<br>6.4 | 32<br>5.9 | 24<br>4.4 | 18<br>3.3 | 21<br>3.9 | 30<br>5.5 | 25<br>4.6 | 25<br>4.6 | 24<br>4.4 | 18<br>3.3 | 32<br>5.9 | 20<br>3.7 | 16<br>2.9 | 25<br>4.6 | 21<br>3.9 | 24<br>4.4 | 20<br>3.7 |
| | | 6.4mm, Notched, 23℃ | 32<br>5.9 | 30<br>5.5 | 20<br>3.7 | 15<br>2.8 | 8<br>1.5 | 10<br>1.8 | 22<br>4.0 | 22<br>4.0 | 30<br>5.5 | 35<br>6.4 | 30<br>5.5 | 24<br>4.4 | 22<br>4.0 | 20<br>3.7 | 32<br>5.9 | 22<br>4.0 | 27<br>5.0 | 18<br>3.3 | 36<br>6.6 | 30<br>5.5 | 30<br>5.5 | 40<br>7.3 | 40<br>7.3 | 24<br>4.4 | 28<br>5.1 | 25<br>4.6 | 18<br>3.3 | 15<br>2.8 | 18<br>3.3 | 24<br>4.4 | 21<br>3.9 | 20<br>3.7 | 18<br>3.3 | 14<br>2.6 | 25<br>4.6 | 18<br>3.3 | 14<br>2.6 | 20<br>3.7 | 18<br>3.3 | 18<br>3.3 | 15<br>2.8 |
| Heat Distortion Temp.,[℃(℉)] | D648 | 18.6kg/cm², Unannealed | 83<br>181 | 84<br>183 | 87<br>189 | 89<br>192 | 88<br>190 | 90<br>194 | 86<br>187 | 86<br>187 | 84<br>183 | 84<br>183 | 82<br>180 | 85<br>185 | 85<br>185 | 85<br>185 | 85<br>185 | 85<br>185 | 86<br>187 | 82<br>180 | 87<br>189 | 88<br>190 | 87<br>189 | 83<br>181 | 84<br>183 | 84<br>183 | 92<br>198 | 94<br>201 | 90<br>194 | 95<br>203 | 105<br>221 | 91<br>196 | 95<br>203 | 92<br>198 | 100<br>212 | 99<br>210 | 94<br>201 | 105<br>221 | 110<br>230 | 94<br>201 | 96<br>205 | 96<br>205 | 101<br>214 |
| Vicat Softening Temp.,[℃(℉)] | D1525 | | 93<br>199 | 94<br>201 | 97<br>207 | 99<br>210 | 98<br>208 | 100<br>212 | 96<br>205 | 96<br>205 | 94<br>201 | 94<br>201 | 92<br>198 | 95<br>203 | 95<br>203 | 95<br>203 | 95<br>203 | 95<br>203 | 86<br>187 | 92<br>198 | 97<br>207 | 98<br>208 | 97<br>207 | 93<br>199 | 94<br>201 | 94<br>201 | 102<br>216 | 104<br>219 | 100<br>212 | 105<br>221 | 115<br>239 | 101<br>214 | 105<br>221 | 102<br>216 | 110<br>230 | 110<br>230 | 104<br>219 | 115<br>239 | 120<br>248 | 104<br>219 | 106<br>223 | 106<br>223 | 111<br>232 |
| Melt Flow Index [g/10min] | D1238 | 220℃, 10.0kg<br>200℃, 21.6kg | 30.0<br>45.0 | 20.0<br>30.0 | 20.0<br>30.0 | 20.0<br>30.0 | 35.0<br>50.0 | 28.0<br>40.0 | 40.0<br>60.0 | 40.0<br>60.0 | 25.0<br>35.0 | 10.0<br>18.0 | 19.0<br>28.0 | 30.0<br>45.0 | 35.0<br>48.0 | 38.0<br>52.0 | 20.0<br>30.0 | 55.0<br>75.0 | 35.0<br>50.0 | 80.0<br>110.0 | 5.0<br>7.0 | 4.5<br>6.0 | 5.0<br>7.0 | 4.0<br>7.5 | 4.5<br>8.0 | 32.0<br>50.0 | 5.0<br>7.0 | 6.0<br>8.0 | 4.0<br>6.0 | 5.0<br>8.0 | 3.5<br>5.0 | 12.0<br>20.0 | 12.0<br>18.0 | 15.0<br>22.0 | 8.0<br>12.0 | 10.0<br>15.0 | 12.0<br>18.0 | 4.0<br>6.0 | 3.0<br>4.5 | 12.0<br>18.0 | 9.0<br>15.0 | 6.0<br>9.0 | 5.5<br>7.5 |
| Shrinkage [%] | D955 | | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.3~0.6 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 | 0.5~0.8 |
| Density | D792 | 23℃ | 1.04 | 1.04 | 1.04 | 1.04 | 1.05 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.08 | 1.08 | 1.05 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.05 | 1.04 | 1.04 | 1.05 | 1.05 |
| Water absorption [%] | D570 | 24hr, Immersion wate | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| UV resistance [△ E] | D4459 | 300hr, Ivory | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Withstanding voltage [V/mil] | D149 | | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Sheet resistance | D257 | | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – | – |
| Flammability [Rating] | UL94* | 1/16"(1.6mm)<br>1/12"(2.2mm)<br>1/8"(3.2mm) | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB | HB<br>HB<br>HB |

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